

Claims

We claim:

SUB A17

1. A method for use in managing data in a database system, comprising:
receiving a request to perform an operation on a set of target data;
initiating execution of the operation; and
at some point after execution has begun, placing a lock on the target data to prevent
concurrent execution of other operations on the target data.

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2. The method of claim 1, comprising placing an initial lock on the target data at a
level that prevents concurrent execution of at least one operation and, at some point after
execution has begun, placing a final lock on the target data at a level that prevents
concurrent execution of a larger set of operations.

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3. The method of claim 2, where the initial lock allows concurrent execution of
operations that involve reading the target data.

4. The method of claim 2, where the final lock prevents concurrent execution of all
operations on the target data.

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5. The method of claim 2, further comprising allowing a user to specify the type of
lock initially placed on the data.

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6. The method of claim 1, where the operation is one of the following types: a
COLLECT STATISTICS operation, a CREATE INDEX operation, and an ALTER
TABLE operation.

7. A database system comprising:
at least one storage device;
at least one computing node configured to deliver data to and retrieve data from the
storage device; and

5 a database-management component configured to:
receive a request to perform an operation on a set of target data;
initiate execution of the operation; and
at some point after execution as begun, place a lock on the target data to
prevent concurrent execution of other operations on the target data.

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8. The system of claim 7, where the database-management system is configured to
place an initial lock on the target data at a level that prevents concurrent execution of at
least one operation and, at some point after execution has begun, placing a final lock on
the target data at a level that prevents concurrent execution of a larger set of operations.

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9. The system of claim 8, where the initial lock allows concurrent execution of at
least one other operation on the target data.

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10. The system of claim 8, where the subsequent lock prevents concurrent
execution of all other operations on the target data.

11. The system of claim 8, where the database-management system is configured to
allow a user to specify the type of lock initially placed on the data.

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12. The system of claim 7, comprising multiple computing nodes and multiple
storage devices, where each storage node is configured to manage storage of data on at
least a subset of the storage devices.

13. The system of claim 12, where the database-management system is configured to place the lock on a block of data that is spread across more than one of the storage devices.

5 14. The system of claim 7, where the operation is one of the following types: a COLLECT STATISTICS operation, a CREATE INDEX operation, and an ALTER TABLE operation.

10 15. A computer program, stored on at least one computer-readable storage medium, for use in managing data in a database system, comprising executable instructions that, when executed by a computer, cause the computer to:

receive a request to perform an operation on a set of target data;

initiate execution of the operation; and

15 at some point after execution has begun, place a lock on the target data to prevent concurrent execution of other operations on the target data.

20 16. The program of claim 15, where the program causes the computer to place an initial lock on the target data at a level that prevents concurrent execution of at least one operation and, at some point after execution has begun, placing a final lock on the target data at a level that prevents concurrent execution of a larger set of operations.

17. The program of claim 16, where the initial lock allows concurrent execution of at least one other operation on the target data.

25 18. The program of claim 16, where the subsequent lock prevents concurrent execution of all other operations on the target data.

19. The program of claim 16, where the program causes the computer to allow a user to specify the type of lock initially placed on the data.

20. The program of claim 15, where the operation is one of the following types: a COLLECT STATISTICS operation, a CREATE INDEX operation, and an ALTER TABLE operation.

5 21. A method for use in managing data in a database system, comprising:
receiving an instruction from a user to perform a data-definition operation on a set
of target data;
placing an initial lock on the target data at a level that allows at least one concurrent
operation on the target data;
10 initiating execution of the operation; and
at some point after execution has begun, placing a final lock on the target data at a
level that excludes all other concurrent operations on the target data.

22. The method of claim 21, where the initial lock excludes at least some
15 concurrent operations on the target data.

23. The method of claim 21, further comprising allowing a user to select the level of
the initial lock.

20 24. The method of claim 21, where placing an initial lock on the target data includes
placing one of the following types of locks on the target data: an ACCESS lock; a READ
lock; and a WRITE lock.

25 25. The method of claim 21, where placing a final lock on the target data includes
placing an EXCLUSIVE lock on the target data.

26. The method of claim 21, where placing an initial lock on the target data includes
locking an entire table.

27. The method of claim 21, where receiving the instruction from the user includes receiving an instruction to perform one of the following operations: a CREATE INDEX operation, a COLLECT STATISTICS operation, and an ALTER TABLE operation.

5 28. A method for use in managing data in a database system, the method comprising:

receiving an instruction to perform a MODIFY DATABASE/USER operation on a set of target data;

initiating execution of the operation; and

10 at some point during execution of the operation, concurrently executing another operation on objects within the targeted database or user.

29. The method of claim 28, further comprising maintaining an ACCESS lock on the target database or user and no locks on the immediate parent of the targeted database
15 or user during execution of the MODIFY DATABASE/USER operation.

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